# TECHNOLOGY FACT SHEET

**MSC-24115-1 Fabric Circuits and Method of Manufacturing Fabric Circuits (USPN 8,022,307)**

NASA has developed a method that employs conductive fabric to form complex circuits. Unlike other attempts, this new technology yields dimensionally stable conductive elements that have predictable and stable impedance characteristics and high surface conductivity, allowing operation at radio frequencies. The layout is achieved such that it is compatible with conventional computer-aided design methods used to fabricate printed antennas. The fabric antennas can withstand the kind of flexing normally encountered in garments. Prototype fabric antennas have been developed and tested. Possible applications include clothing-based antennas, stealth and surveillance electronics, battlefield communications systems, fabric-skinned aircraft and balloons, sensors and sensor networks on fabric structures, and others.

## Benefits

- Enables complexity: Complex circuitry is possible; intricate patterns, such as those used for directional couplers or logarithmic spiral antennas, can be achieved
- Improved performance: Dimensional accuracy improves control of impedances, allowing efficient radio frequency (RF) operation
- Enables automation: Automated manufacturing techniques, some of which are already used in the apparel industry, are applied; a higher degree of automation is possible than in competing methods
- Cost-effective: Set-up cost is modest and comparable to that of printed circuitry
- Washable: The expectation is that clothing incorporating these fabric-based antennas can be laundered normally
- Durable: These fabric-based antennas and circuits can typically be subjected to small radius flexing without damage

## Applications

- Clothing-based antennas
- Fabric-skinned aircraft and balloons
- Sensors and sensor networks on fabric structures
- Membranes for large deployable reflector antennas
- Small deployable antenna systems
- Battlefield communication systems
- Stealth and surveillance electronics
- Antennas for sails and tents

## Patent

JSC has received patent protection for this technology (USPN 8,022,307).

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## Licensing and Partnering Opportunity

This technology is being made available through JSC's Technology Transfer and Commercialization Office, which seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to consider licensing this technology for commercial applications.

## Contact Information

If you would like more information about this technology or about NASA's technology transfer program, please contact:

Technology Transfer and Commercialization Office
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